English Version

◈ **Please read thoroughly before installation.**

◈ **Visit our website (www.zalman.co.kr) and watch the TNN 300 installation video first to make your installation easier.**

English

Welcome

Congratulations on your purchase of ZALMAN Tech's TNN 300.
With TNN 300, you have now entered the world of silent computing.
TNN 300 is the ultimate answer to every computer user's dream of creating a silent computing environment with total system stability.

Contents

1. Safety Notices *3*

2. Features *4*

3. Specifications *8*

4. Components *10*

5. Compatibility *13*

6. Operational Notes *17*

7. Patents *17*

8. Optional Components *18*

9. Installation Guide *19*

10. Trademarks and Copyright Notice *33*

1 Safety Notices

1) **This unit must be kept away from heat sources and direct sunlight.**
2) **This unit must be used in a well ventilated environment.**
3) This unit should be placed on a flat, level, and solid surface.
4) Always shut down the operating system then disconnect the AC power cable form the AC outlet and power supply before disassembling.
5) Keep this unit in an upright position when the power is ON.
6) Do not place or spill liquids on this unit.
7) Avoid inserting any objects into the system while it is ON.
8) If this unit is to be transported long distances, place it in the original packing box or a custom made hard case.
9) Do not drop this unit or subject it to shock while it is in transit.
10) Place the system out of the reach of children.
11) Check the condition of the product and its components before installation. If there is a problem with the product and/or its components, please contact the retailer for replacement.

◈ Disclaimer

Zalman Tech Co., Ltd. is not responsible for any damages due to external causes, including but not limited to, improper use, problems with electrical power, accident, neglect, alteration, repair, improper installation, or improper testing.

2 Features

TNN 300 is the latest in the world's first truly noiseless high-end computer case series, developed with heatpipe technology, HSC (Heat Source Contact) power technology, HCET (High Capacity Extrusion Technique), and FMS (Flexible Mounting Structure) design technology by ZALMAN Tech Co., Ltd. Its reduced weight and size compared to the previous models enhance user convenience.

The TNN 300's high quality chassis is anodized and finished in black, blending function with style. It is ideal for home theater systems, and quiet environments such as bedrooms, educational facilities, and offices.

1) Complete Silence

The cooling system does not generate any noise because it does not utilize any fans.

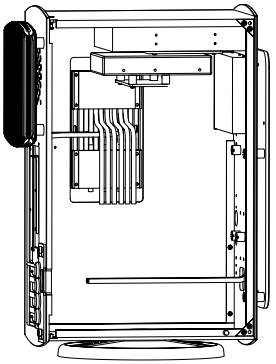
Hard drive vibration is absorbed by dampers, and the thick aluminum case contains noise from emanating out of the case.

2) Stability

① Fanless System

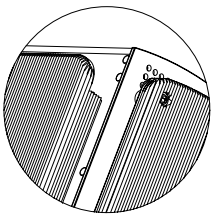
The majority of heat generated inside the system is transferred through heatpipes to the heatsink plates, where it is dissipated via natural convection.

This dramatically reduces the inflow of dust and, consequently prevents system crashes caused by dust buildup and fan failures
(fans last around 20,000 to 50,000 hours).



② Environment Friendly System

Large, aluminum heatsink plates silently cool heat-generating components, such as the CPU, VGA Chipset, and PSU through natural convection. It is virtually free of mechanical maintenance and is 100% recyclable.

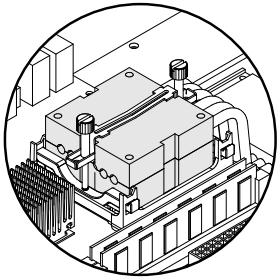


③ Heat Transfer via Heatpipes

Virtually ever-lasting heatpipes transfer heat away from the CPU and VGA chipset, preventing system crashes due to overheating.

- **CPU Heatpipes**

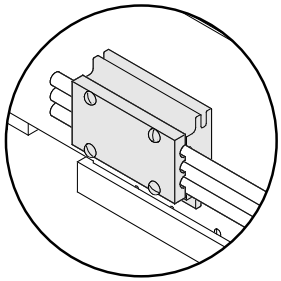
Heat from the CPU is transferred to the heatsink plate through 6 heatpipes each 6 millimeters in diameter. The CPU Block Base is made of pure copper to ensure the highest cooling performance.



CPU Heatpipes

- **VGA Card Heatpipes**

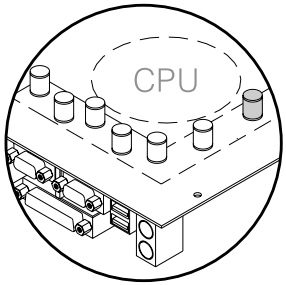
Heat from the VGA Card is transferred to the heatsink plate through 3 heatpipes each 6 millimeters in diameter.



VGA Card Heatpipes

④ Heat Transfer via Rear-mount Thermal Blocks

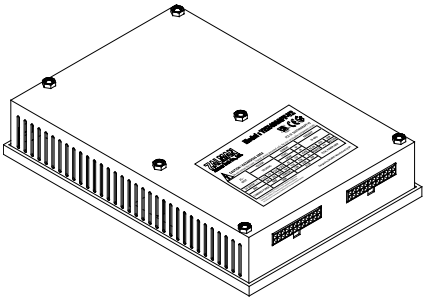
When the Rear-mount Thermal Blocks are installed on the back-side of the motherboard in line with the position of the FETs (Field Effect Transistor) and the Northbridge chipset, each can lower the FET temperature by 10 to 30°C (50 to 86°F) and the Northbridge chipset by 5 to 10°C (41 to 50°F).



Rear-mount Thermal Blocks

⑤ High-Efficiency Fanless Power Supply

- The power supply uses two high-efficiency FET components to reduce switching loss at low input voltages, incorporates Heat Source Contact (HSC) technology to eliminate the need for a fan, and has a 10% higher power conversion efficiency (80%) rating than conventional power supplies.



- Heat from the power supply is transferred directly to the high-capacity heatsink plates, where it is dissipated by natural convection. Without the need for cooling fans, the power supply is free of noise and vibration.
- Noise reduction and enhanced efficiency via resonant circuitry.
- Minimized standby power consumption to less than 3W via Green IC.
- Conventional power supplies tend to have lower output voltage due to line-dropping phenomenon. The TNN Power Supply extends the output voltage sensors up to the motherboard connection for +3.3V, +5V, and +12V rails to prevent this, enhancing output voltage accuracy and assuring system stability.

■ Ripple and Noise Waveforms at DC Outputs

a)+12V1DC (104mVp-p) | b)+12V2DC (106mVp-p) | c)+3.3VDC (42mVp-p) | d)+5VDC (42mVp-p) | e)+5VSB (28mVp-p) | f)-12VDC (82mVp-p)

※ Data above were measured according to INTEL ATX v2.03/ATX12V power supply specs. Measurement specifications : For each DC output, a bypass made up of one 10㎌ ceramic capacitor and one 10㎌ electrolytic capacitor is connected and measured with an oscilloscope (input impedance 1MΩ) at a frequency bandwidth of 20MHz. The waveforms may differ under different measurement conditions.

3) Energy Conservation

The TNN 300 is equipped with a high-efficiency power supply and does not utilize any fans, it resulting in approximately 10 % less power consumption compared to a conventional computer system, under the same configuration.

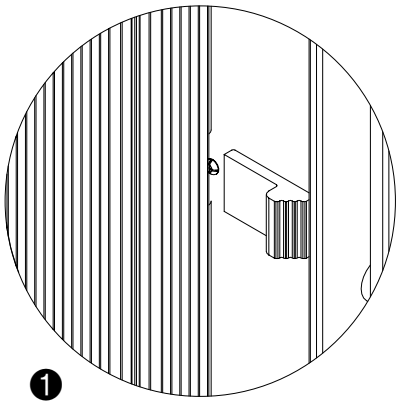
4) User Friendly Design

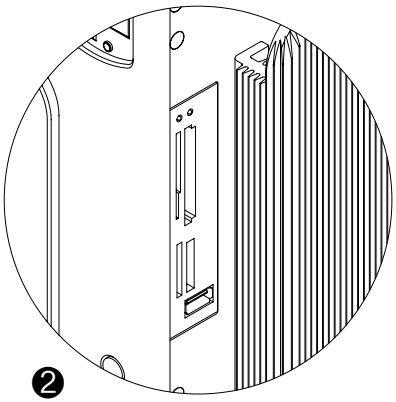
① Side-door design with latch.

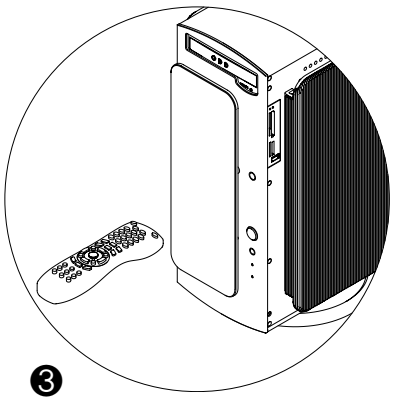
② USB 2.0 port and flash memory reader supporting 21 types of cards.

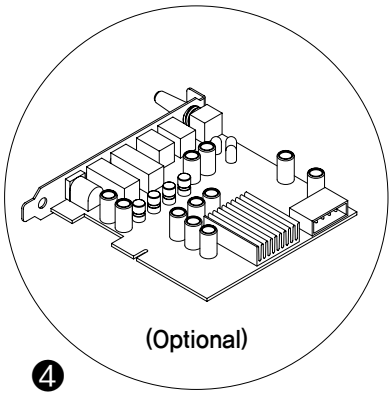
③ Remote control for enabling multimedia system operation and control.

④ Optional high-quality, digital audio amp for building a home theater system.









3 Specifications

1) Dimensions (L x W x H) : 330 x 230 x 470 mm

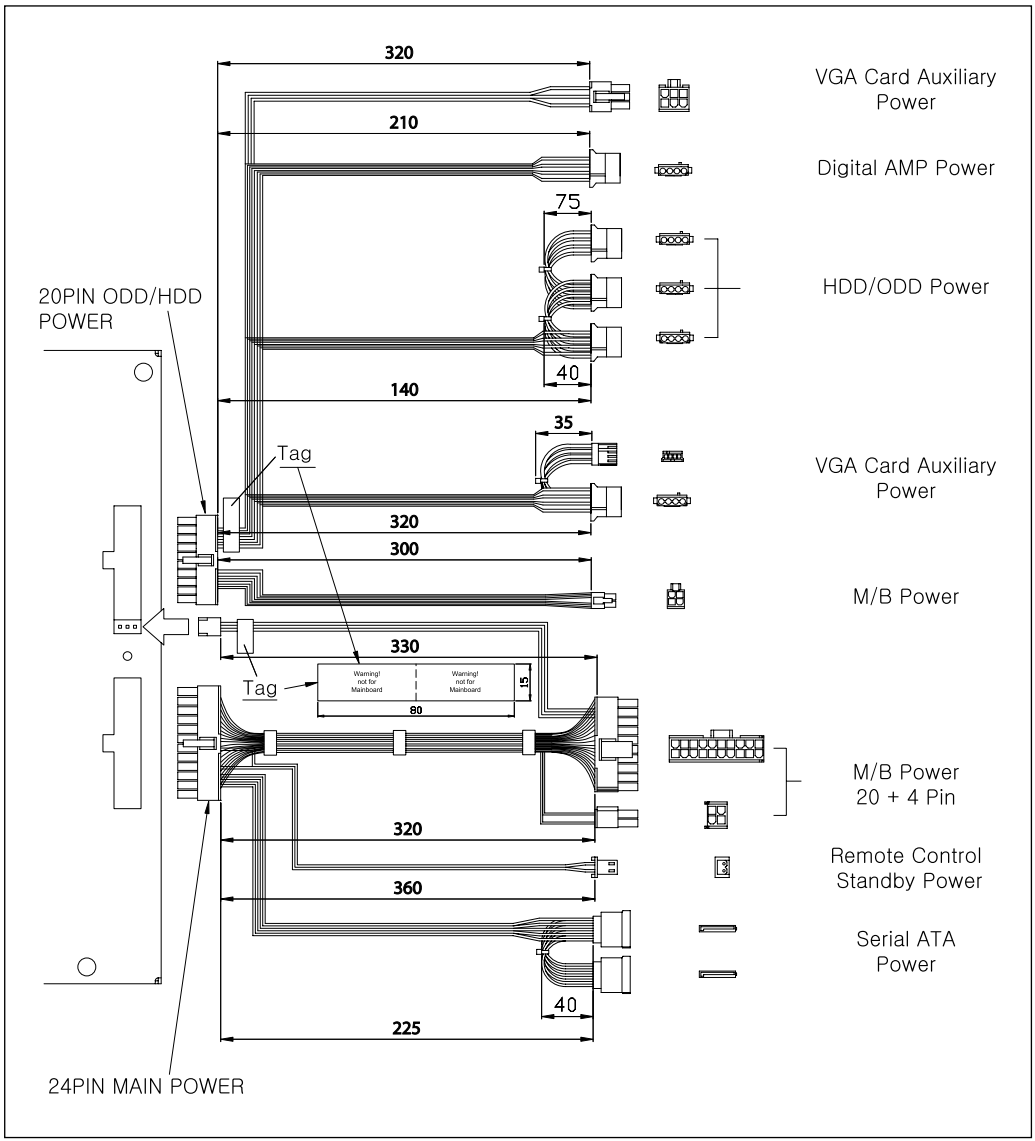
2) Weight : 14.74Kg

3) Power Supply Capacity : 350W

※ Power Supply Electrical Characteristics (Model: TNN350APF-V1)

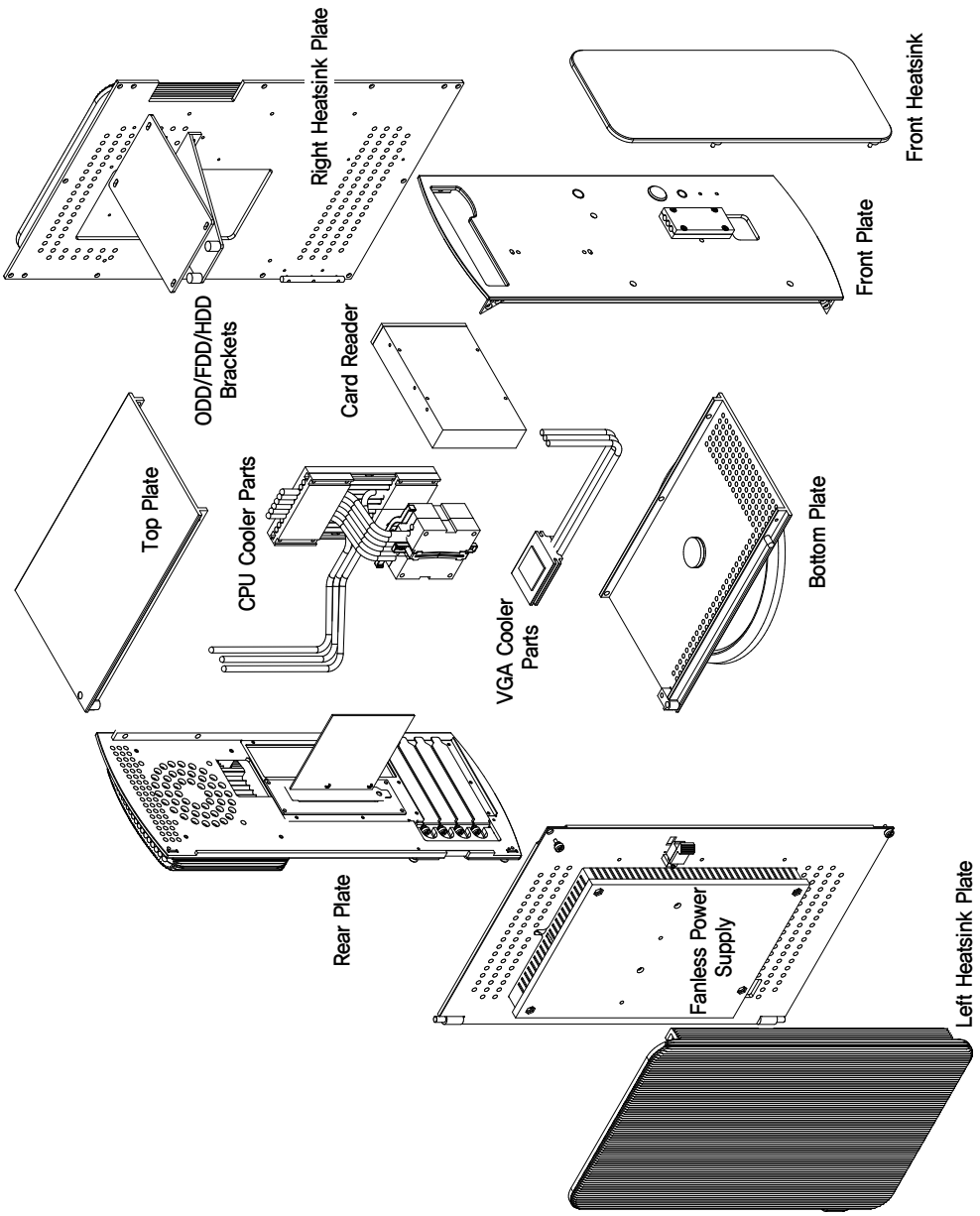
AC Input Range					Output	Output Load Range			Combined (I max)	
	Voltage	100VAC ~ 240VAC ± 10%				Imin	Imax	Ipeak		
	Frequency	50Hz ~ 60Hz								
AC Input Current (Sustained)	115VAC	8A			+3.3VDC	0.5A	20A		94.6W	336.4W
	230VAC	4A			+5VDC	0.5A	20A			
Inrush Current Limit (@25℃ Cold Run)	115VAC	30A			+12V1DC	0.1A	10A	18A	240W	
	230VAC	60A			12V2DC	0A	15A			
Efficiency	Min. 80% @ 230VAC (Full Load)				-12VDC	0A	0.3A		3.6W	13.6W
DC Output Voltage Stability	Output	Stable Range		Under Full Load	+5VSB	0A	2A	2.5A	10W	
	+5VSB	±5%	+4.75V ~ +5.25V		TOTAL				350W	
	+3.3VDC	±5%	+3.14V ~ +3.45V							
	+5VDC	±5%	+4.75V ~ +5.25V							
	+12V1DC	±5%	+11.4V ~ +12.6V							
	+12V2DC	±5%	+11.4V ~ +12.6V							
	-12VDC	±10%	-10.8V ~ -13.2V		Protection Features					
DC Output Ripple & Noise	Output	Nominal Range		Under Full Load	Over Temperature Protection (OTP)					
	+5VSB	50mv			Over Voltage Protection (OVP)					
	+3.3VDC	80mV			Over Current Protection (OCP)					
	+5VDC	80mV			Under Voltage Protection (UVP)					
	+12V1DC	120mV			Short Circuit Protection (SCP)					
	12V2DC	120mV			EMC (EMI & EMS)					
	-12VDC	120mV			FCC Part 15 class 'B', CISPR22					
					UL, CE, CB, MIC					

4) Power Output Cables

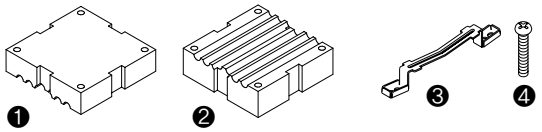


※ **Note** : Before connecting the output cables to the noiseless power supply, please check the tags (20-pin, 3-pin) to make sure the correct cables are used.

4 Components

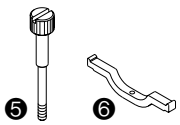


1) Heatpipe CPU Cooler Parts (1 Pack)



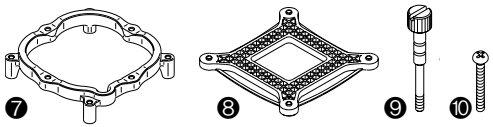
① One (1) CPU Block Cover
② One (1) CPU Block Base
③ One (1) CPU Clip
④ Four (4) PH M4X22 Bolts

1) For Intel P4 (Socket 478)



⑤ Two (2) Socket 478 Finger Bolts (M3X52)
⑥ Two (2) Socket 478 Clip Supports

2) For Intel Pentium 4 (Socket 775)

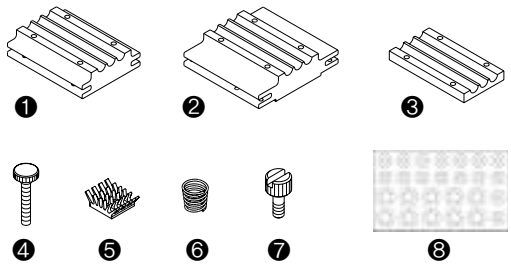


⑦ One (1) Socket 775 Clip Support
⑧ One (1) Socket 775 Back Plate
⑨ Two (2) Socket 775 Finger Bolts (M3X49)
⑩ Four (4) PH M3X22 Bolts

3) For AMD AMD64

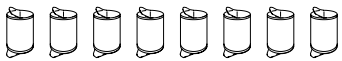
⑪ One (1) AMD 64 Back Plate
⑫ Two (2) AMD 64 Finger Bolts (#6-32X40)
⑬ Two (2) AMD 64 Nipples

2) Heatpipe VGA Cooler Parts (1 Pack)



① One (1) VGA Block A
② One (1) VGA Block B
③ One (1) VGA Block Cover
④ Four (4) VGA Finger Bolt A (M2.5)
⑤ Eight (8) RAM Heatsinks
⑥ Four (4) VGA Springs
⑦ Four (4) VGA Finger Bolt B (M3)
⑧ One (1) Sheet of Paper Washers

3) Rear-mount Thermal Blocks



① One 0(1) Set of RTB1

4) HDD Bolts (1 Pack)

① Eight (8) PH#6-32X7 Bolts
② Eight (8) HDD Dampers

5) ODD Bolts (1 Pack)

Four (4) PH M3X8 Bolts

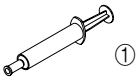
6) Motherboard Bolts (1 Pack)

Nine (9) PWH M3X5 Bolts

7) Door Support Bolt

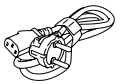
① One (1) Door Support Bolt

8) Thermal Grease



① Thermal Grease 2.5 ml

9) Power Cord (1 Pack)

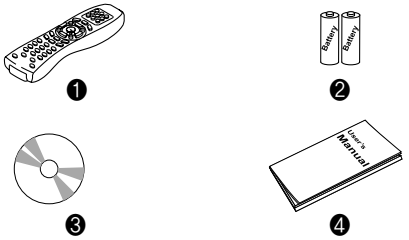


① One (1) Power Cord

10)TNN300 User's Guide

① TNN 300 One (1)
Copy of User's Guide

11) Remote Controller Set



① One (1) Remote Control

② Two (2) Batteries

③ One (1) Install CD

④ One (1) Copy of iMON & Multi-Median User's Guide

12)Card Reader Driver CD

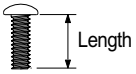
① One (1) Card Reader
Driver CD

13) Spare parts (1 Pack)

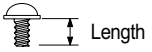
Note) Bolt Specs

PH M4X20 : Pan Head, Meter Screw, 4mm in Diameter, 20mm in Length

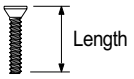
FH #6-32X8 : Flat Head, Screw #6, 32 Pitches per Inch, 8mm in Length



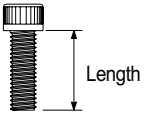
PH (Pan Head)



PWH (Pan-Washer Head)



FH (Flat Head)



SH (Socket Head)

5 Compatibility

1) CPU : CPUs with a Thermal Design Power (TDP) of up to 70W

(As of Aug. 30, 2005)

Manufacturer	Socket	Processor	Compatibility
Intel	478	Pentium4 Northwood	Up to 2.8C
	479m	Pentium4 Dothan/Banias	Supports All Speeds
AMD	754	Sempron Palermo	Up to 3300+
	939	AMD64 Winchester/Venice	Up to 3500+

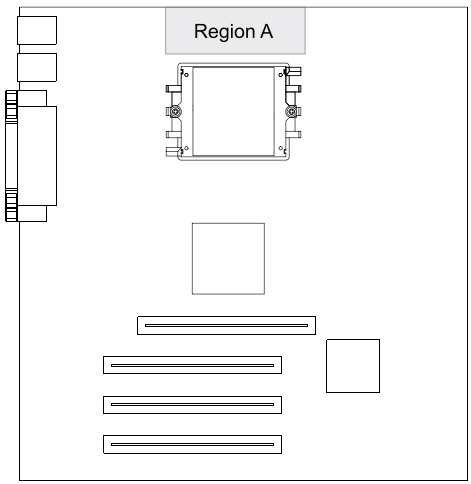
※ Note

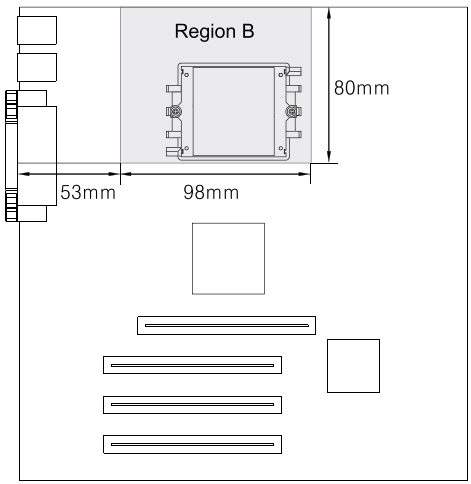
- ▶ Most Intel P4 (Socket 775) CPUs have a TDP rating of 70W or greater, so check the TDP before installation.
- ▶ When using the latest CPUs, visit the CPU manufacturer's website to check the updated information on the CPUs before use.

2) Motherboard : microATX Type

※ Note

- ▶ If the power connector or RAM slot is located in Region A (above the CPU) : Not compatible due to interference with CPU heatpipes.
- ▶ If the FETs are located in Region B : Not compatible because FET cooling components (ZM-RTB1) cannot be installed.





3) VGA Card : AGP / PCI Express VGA Cards with Heatsink Mounting Holes

(As of Aug. 30, 2005)

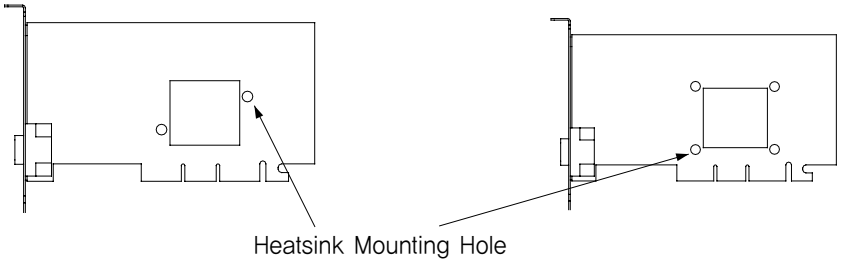
Manufacturer	Model
ATI	Up to Radeon X700 Pro
nVidia	Up to GeForce 6600

※ Note

① NVIDIA PCX Series VGA Cards are not supported. Replace with a Zalman-recommended VGA card.

② If the VGA card does not install properly due to physical incompatibility with the case, stop installation and replace with a Zalman-recommended VGA card listed on the following website.(www.zalman.co.kr/product/TNN300.html)

Reference)



Reference)

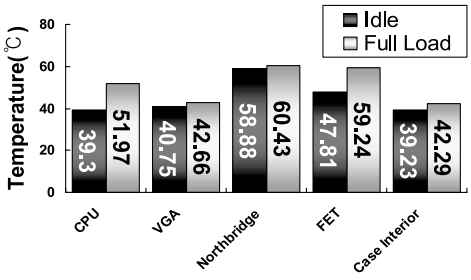
Refer to zalman's website for motherboards, HDDs, and ODDs suitable for building a TNN 300 system. (www.zalman.co.kr/product/TNN300.html)

※ Reference : Performance Tests

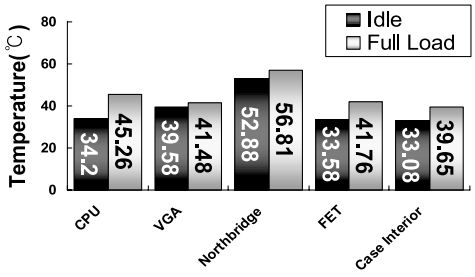
1. Thermal Performance Test Results

(Room Temperature : 28℃)

	Component	TNN 300 System Temperature(℃)		Conventional System Temperature(℃)		Notes
		Idle	Full Load	Idle	Full Load	
1	CPU	39.3	51.97	34.2	45.26	Daq/56
2	VGA	40.75	42.66	39.58	41.48	Daq/56
3	Northbridge	58.88	60.43	52.88	56.81	Daq/56
4	FET (Around CPU)	47.81	59.24	33.58	41.76	Daq/56
5	Case Interior	39.23	42.29	33.08	39.65	Daq/56

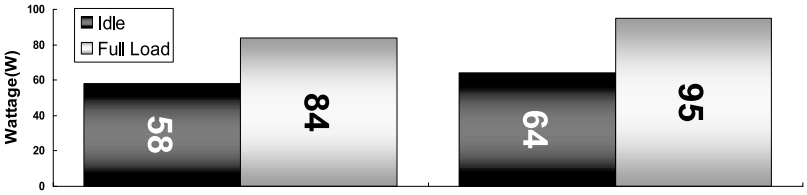


TNN 300 System



Conventional System

2. Power Consumption Test Results



TNN 300 System

Conventional System

3. Test Environments

① Test PC Configurations

	TNN 300 System	Conventional System
Case	TNN 300	GMC M-10
CPU	AMD Athlon 64 3500+	
CPU Cooler	Fanless Heatpipe CPU Cooler	AMD Stock CPU Cooler
Motherboard	ASRock 939A8X-M (939)	
HDD	Seagate Barracuda 160G 8MB (7200rpm)	
ODD	Samsung Combo 52X	
RAM	Samsung DDR 256MB	
VGA Card	ATI Radeon 9550 AGP 8X (128MB)	
VGA Card Cooler	Fanless Heatpipe VGA Cooler & RAM Heatsinks	VGA Card Stock Cooler
Northbridge Cooler	Fanless Heatpipe Northbridge Cooler & Rear-mount Thermal Blocks	ASRock M/B Stock Cooler
Power Supply	Fanless TNN350APF-V2(350W)	Powernics Micro 350DFP
Exhaust Fan	None	60 mm Fan

② Fan rpm (@ Full Load)

Fan Position	TNN 300 AMD System (rpm)	Conventional AMD System (rpm)
CPU Cooler	N/A (Not Applicable)	3,034
VGA Cooler	N/A	4,986
Northbridge Cooler	N/A	N/A
Ventilation Fan	N/A	3,300

③ Testing Equipments and Software

▣ CPU Loading Program
CPU BURN (K7, High)

▣ Measurement Instrument
Personal Daq / 56 (Iotech, Inc.) KIKUSUI PCR 1000L

▣ Temperature Measurement Program
DaqView (Iotech, Inc.)

6 Operational Notes

1) Recommended Room Temperature : 20~25℃ (Ambient)

Operation in comfortable room temperature is recommended.

2) Precautionary Notes on Booting

When booting the computer, it may automatically power down after an alarm sound is generated. This is an indication by a system monitoring program that the rotation of the CPU fan is slow. If this happens, connect the Stock CPU cooler's fan power cable to the 3-pin CPU fan connector on the motherboard.
Boot the system and set "CPU Fan Detected" to "Disabled" in the BIOS settings.
Turn the system off, remove the CPU Cooler fan, and reboot.

※ Note

- ▶ Some motherboards do not boot if the rotation of the CPU fan is not detected. There might not be a "CPU Fan Detected" setting in the BIOS setup, but updating the BIOS could solve this problem. For more information on updating the BIOS, please refer to your motherboard manufacturer's website.
- ▶ When using an Intel motherboard, if you remove the motherboard from an existing system and attach it to the TNN 300, the system's Active Monitor may generate an alarm sound warning that there is no CPU fan. Remove Active Monitor from Add/Remove Programs applet in Control Panel and reinstall.

7 Patents

◈ Korean Patent Application #04-27563
◈ Korean Patent Application #04-74220
◈ Korean Patent Application #04-82817
◈ Korean Design Application #347413
◈ International patent applications pending in the EU, USA, Japan and 30+ other countries

8 Optional Components

Digital Amp

This product is a high-performance 2-channel digital power amp with 50 W of maximum output. When used with 4 to 8-ohm speakers, its high quality output surpasses the quality of conventional consumer audio systems, making it an ideal component for setting up a home theater system.

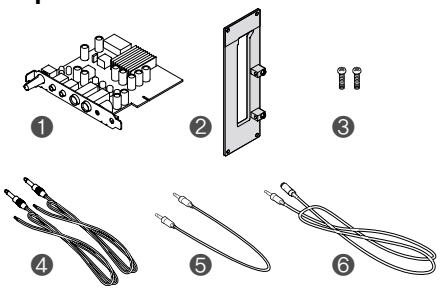
1) Features

① Pop-noise removal circuit
② Zero white / power noise
③ Auto power conservation mode (activates after 3 minutes of idle input)
④ Output level adjustable with jumpers (0 dB / 3 dB level)
⑤ High quality connectors (ALPS) & high-brightness LEDs (Redx1, Bluex2)

2) Specifications

① Dimensions (W x H) : 105 X 100 mm
② Line Input Connectors (2CH) - External: 3.5 mm Stereo Jack
③ Headphone Output (2CH) - External : 3.5 mm Stereo Jack
④ Speaker Output : 4~8Ω per Channel / Connector
⑤ Power Amp Output : 25 Watts / channel @ 4Ω
⑥ Headphone Amp Output : 250 mWatts / channel @ 16Ω
⑦ Signal to Noise Ratio : 100dB "(A)" Weighted
⑧ Input Impedance : 50 kΩ
⑨ Gain : off.~ / + 22 dB max.
⑩ Power Consumption (2 Channels) : Less than 0.5 W @ 14.6 VDC (idle power)
50 W Maximum @ 14.6 VDC (81% power - 4 Ω)
⑪ Frequency Response : 20 Hz ~ 20 KHz
⑫ Total Harmonic Distortion (THD) : 0.05 %, 13 W / channel @ 4 Ω

3) Components



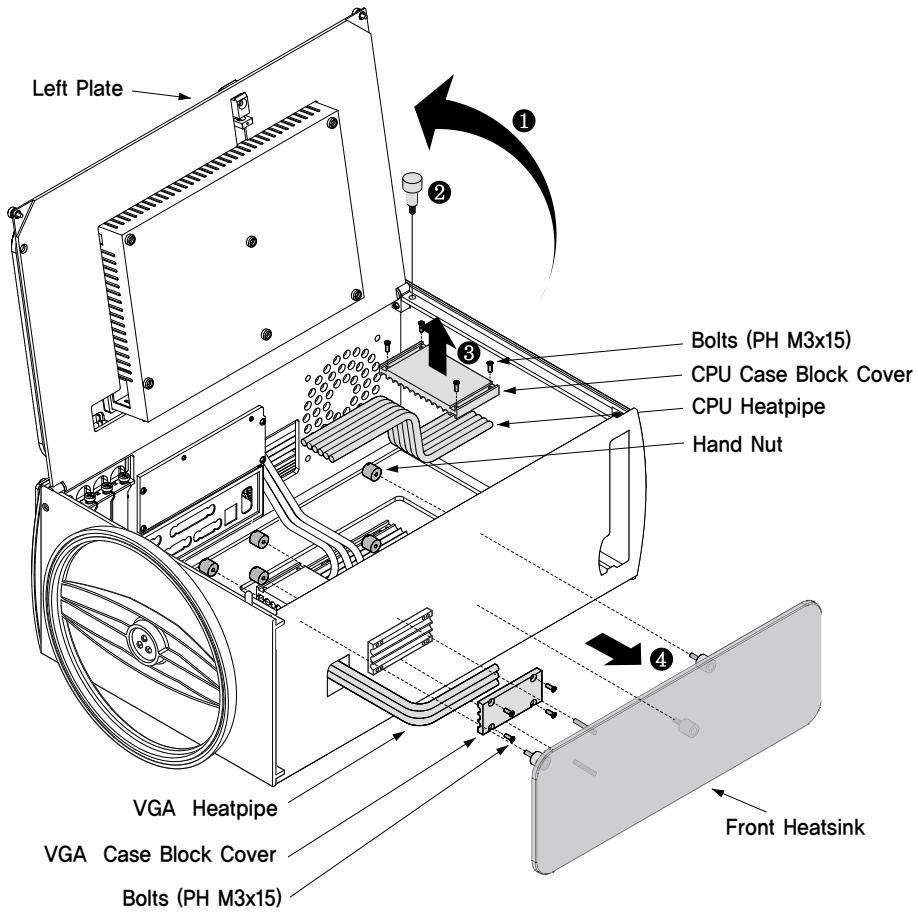
① One(1) Digital Amp
② One(1) Amp Panel
③ Two(2) BH M2.3x6 Bolts
④ Two(2) Jack to Speaker Cable
⑤ One(1) 3.5mm Stereo Cable
⑥ One(1) Headphone Extension Cable

9 Installation Guide

1) Disassembling the TNN 300 Case and Components

① As shown in the diagram, lay the TNN 300 down on a flat surface and open the left plate.

② Install the door support bolt.



③ Separate the CPU case block cover and the six CPU heatpipes.

④ Remove the front heatsink and separate the three VGA heatpipes.

⑤ After removing the necessary blocks and heatpipes using a screwdriver, store them in a safe place.

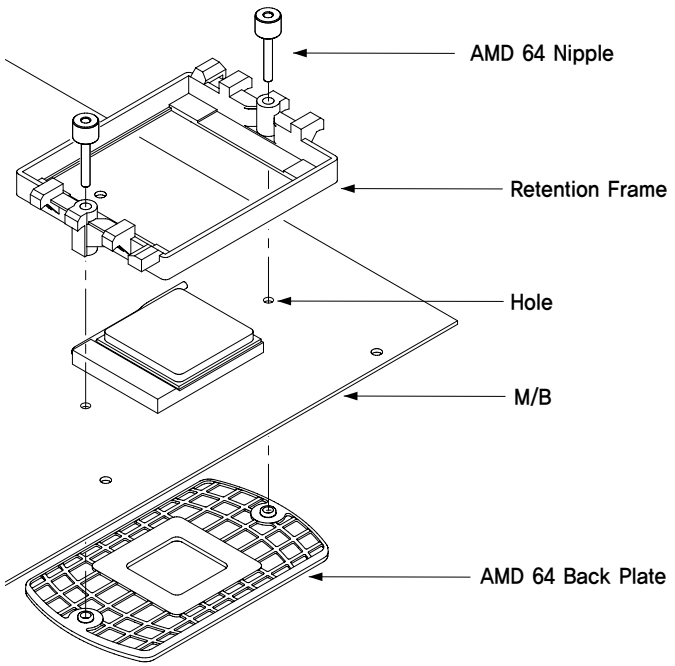
2) Assembling the CPU Clip Support

※ Note

Do not use a CPU with a TDP higher than 70W on this product. Most Intel P4 (Socket 775) CPUs have a TDP rating higher than 70W, so check the CPU's thermal specifications before installation.

▶ For AMD AMD64 Motherboards

Insert the AMD64 Nipples into the holes on the Retention Frame and fasten the AMD64 Back Plate.



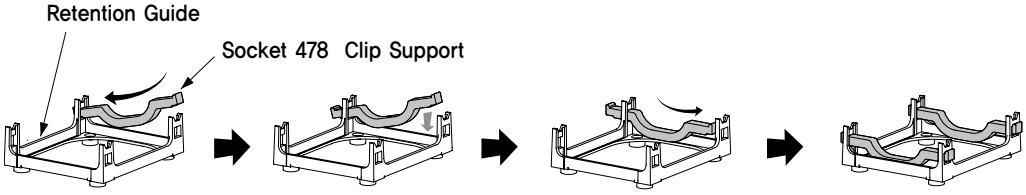
AMD AMD64 Socket 754/939/940 Motherboard

Reference)

For some AMD64 motherboards, attachment methods may resemble the Intel P4 Socket 478 installation instead. In this case, refer to the Intel Socket 478 motherboard instructions.

▶ For Intel P4 Socket 478 Motherboards

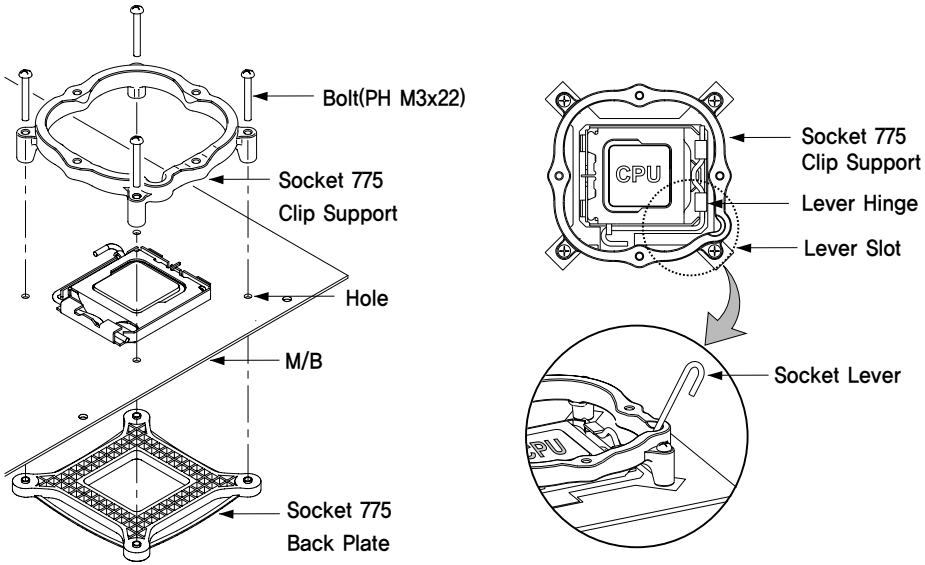
Insert the AMD64 Nipples into the holes on the Retention Frame and fasten the AMD64 Back Plate.



Intel P4 Socket 478 Motherboard

▶ For Intel P4 Socket 775 Motherboards

Align the Socket 775 Clip Support and the Socket 775 Back Plate with the mounting holes on the motherboard and fasten with bolts (PH M3x22).



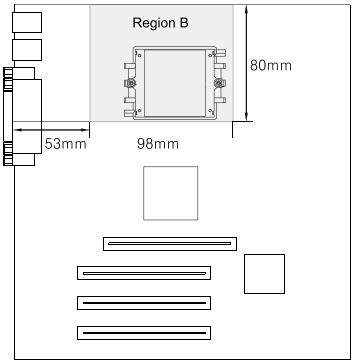
Intel P4 Socket 775 Motherboard

※ **Note :** The Lever Slot on the Clip Support should be properly oriented on the hinged side of the Socket Lever when installing.

3) Installing the Rear-mount Thermal Blocks

※ Note

▶ Motherboards, that have a Northbridge chipset with integrated video capability and/or a fan, are not recommended. If such Northbridge is used, the Rear-mount Thermal Blocks MUST be installed.



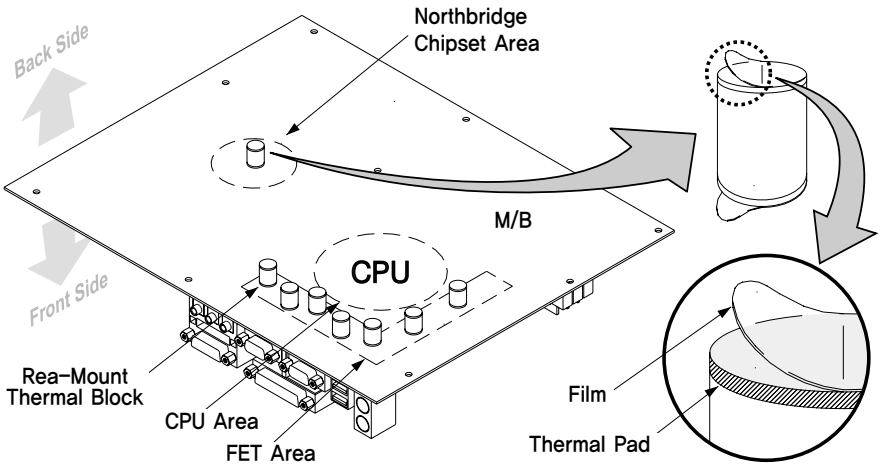
▶ During installation, if there is interference with other components or the FETs near the CPU are located in region B, the RTB1's cannot be installed. In this case, stop installing and replace the motherboard with one that is recommended.
(www.zalman.co.kr/product/TNN300.html)

▶ To prevent short circuiting the motherboard, the Rear-mount Thermal Blocks must be installed on flat surfaces without bare wires or solder points.

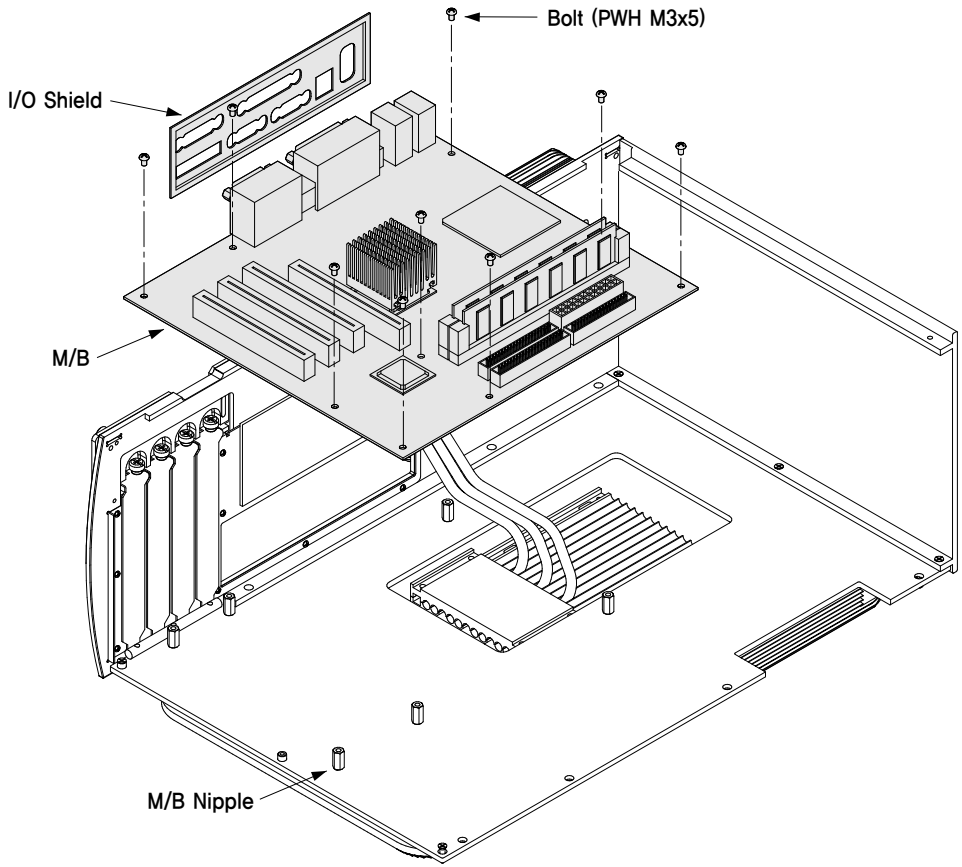
▶ Thermal pads lose adhesiveness once used, so do not touch the pad's surface with hands.

① Clean the surface of the points (rear side of the FET and the Northbridge chipset) where the RTB1s will be attached.

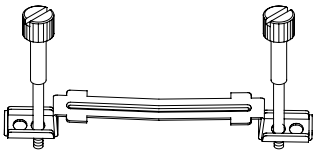
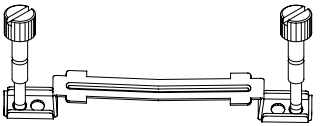
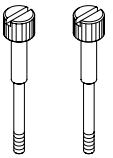
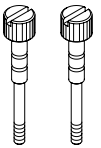
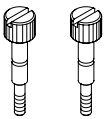
② Peel off the Film from the Thermal Pad on both ends of the block and stick the block on the determined location.



③ Install the motherboard with bolts (PWH M3x5) while taking precautions to avoid detachment of the RTB1's.

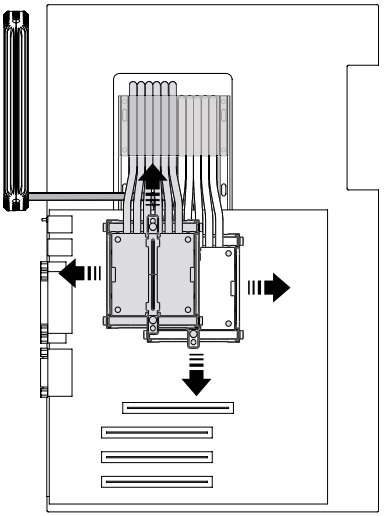


4) Installing the Heatpipe CPU Cooler

TYPE	Intel P4 Socket 478	Intel P4 Socket 775	AMD AMD64 Socket 754/939/940
Appropriate Installation Holes	 (Inner Holes)		 (Outer Holes)
Finger Bolts To Use	 Socket 478 Finger Bolts (M3x52)	 Socket 775 Finger Bolts (M3x49)	 AMD64 Finger Bolts (M3x40)

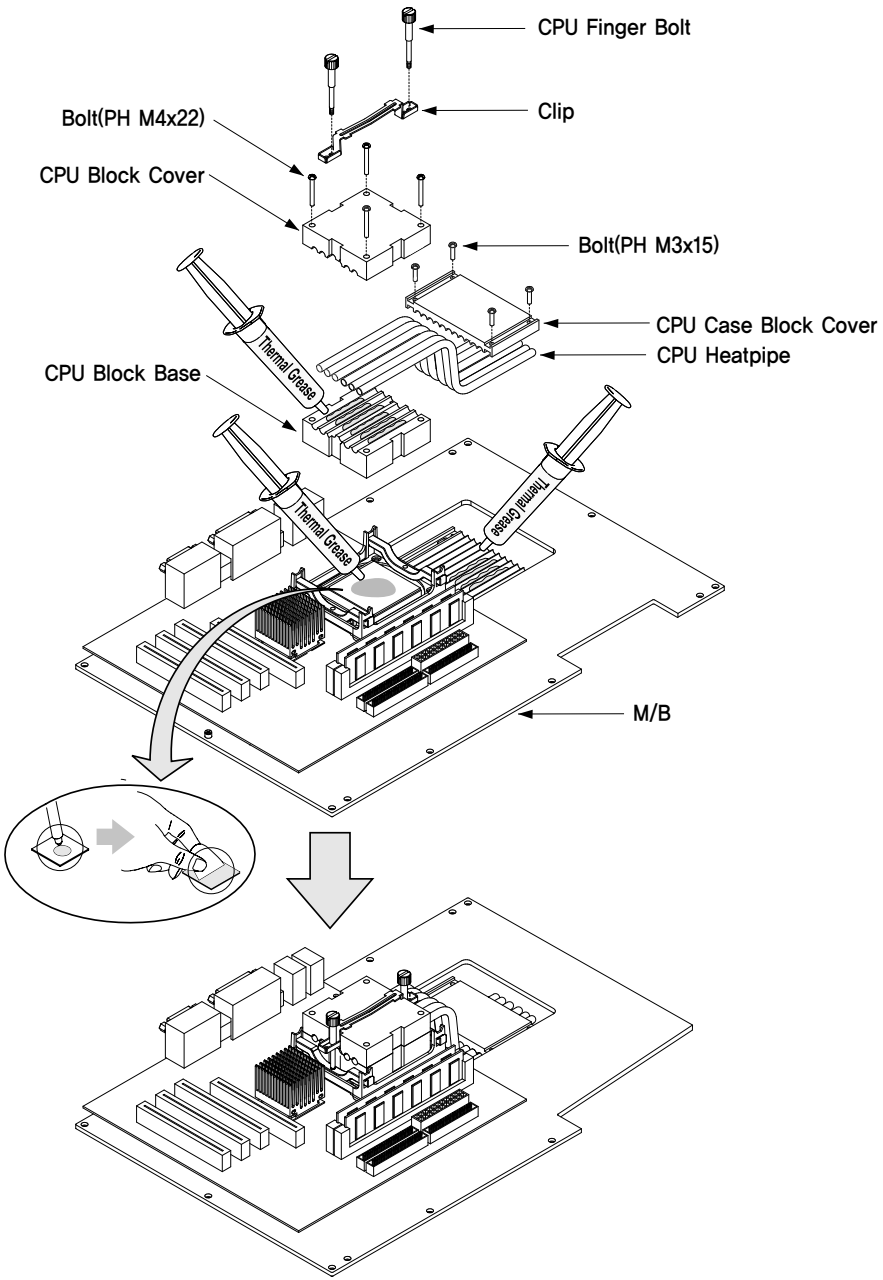
※ Note

- ▶ The CPU block and the heatpipes can be moved to a certain extent to accommodate the position of the CPU. If the CPU is positioned beyond the installable area, stop assembling and replace the motherboard with one that is recommended. (www.zalman.co.kr/product/TNN300.html)
- ▶ Apply an even, generous quantity of thermal grease (1mm or 0.04 inches in height) on the CPU core, and install the CPU block base (gold colored).
- ▶ Apply thermal grease on the grooves of the CPU block base and the CPU case block base, where the CPU heatpipes make contact.
- ▶ The CPU case block base already has thermal grease coated underneath, so it should not be taken off under any circumstances.



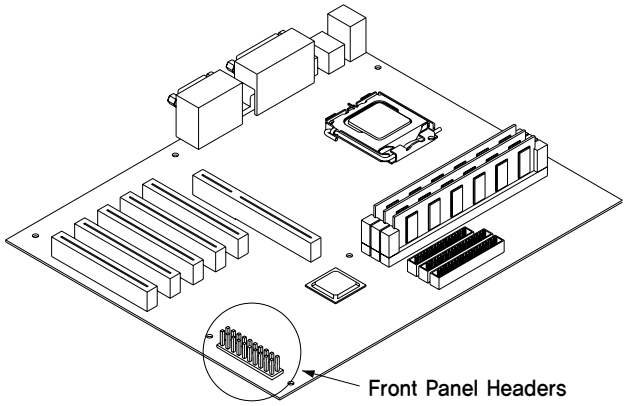
- ▶ Use a coin or a screwdriver to firmly tighten the CPU finger bolts.

Install the Heatpipe CPU Cooler as shown in the diagram.

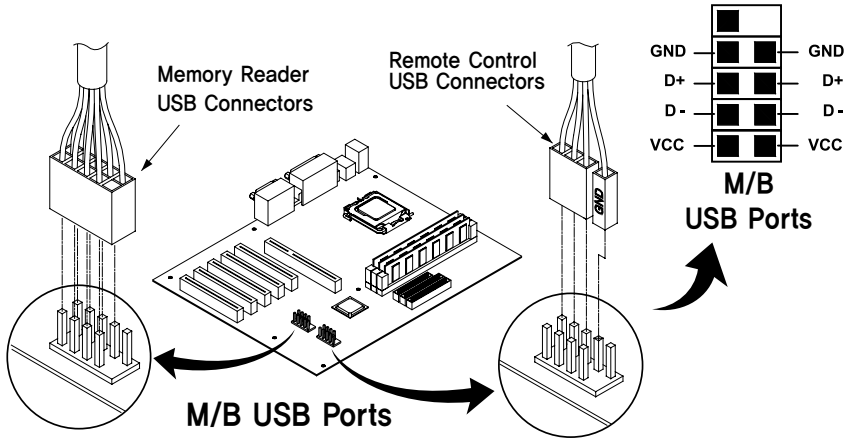


5) Connecting the Front Panel / USB Connectors

① Connect the appropriate front panel connector (Power Switch, Reset Switch, Power LED, HDD LED) to the motherboard's front panel headers.



② Connect the remote control USB connector and memory reader USB connector to the motherboard's USB ports.



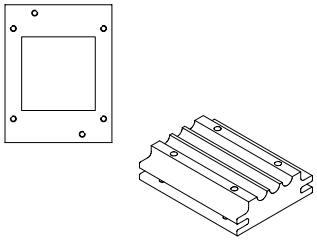
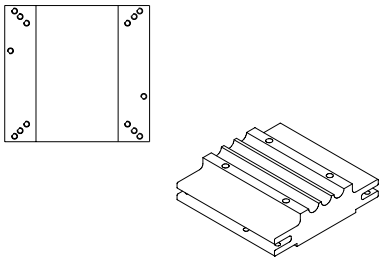
Reference)

1) Refer to the motherboard manual to check the location of the ports and the layout of the header pins.

2) Color Codes

VCC : Red (Yellow), USBD- : White (Orange), USBD+ : Green (Blue), GND : Black

6) Installing the Heatpipe VGA Cooler

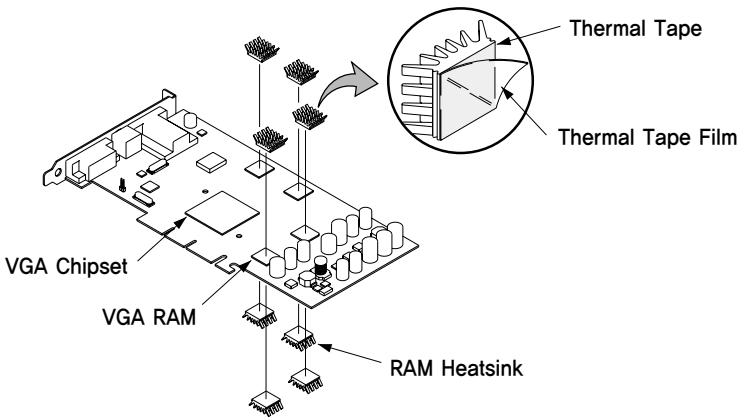
TYPE	VGA Block Base A	VGA Block Base B
Block		
ATI	ATI Radeon Series	–
NVIDIA	GeForce 4 Ti Series	GeForce 5900 Series
	GeForce 3 MX Series	GeForce 6600 Series

※ Note

- ▶ If the VGA card interferes with certain components of the case, stop assembling and replace the card with one that is recommended. (www.zalman.co.kr/product/TNN300.html)
- ▶ Zalman Tech is not responsible for any damages due to user negligence during the CPU cooler removal or installation process.
- ▶ The bonding strength of the thermal tapes reaches 90% after 24 hours of curing.
- ▶ If you need to reattach the used RAM heatsinks, purchase thermal tapes separately to ensure strong adhesion.

① Remove the stock VGA cooler on the VGA card and clean off the exposed contact surface (VGA chipset and RAM) completely of particles using acetone or alcohol.

② Peel off the film from the thermal tape on the bottom of the RAM heatsinks and stick the RAM heatsinks onto the VGA RAM chips.



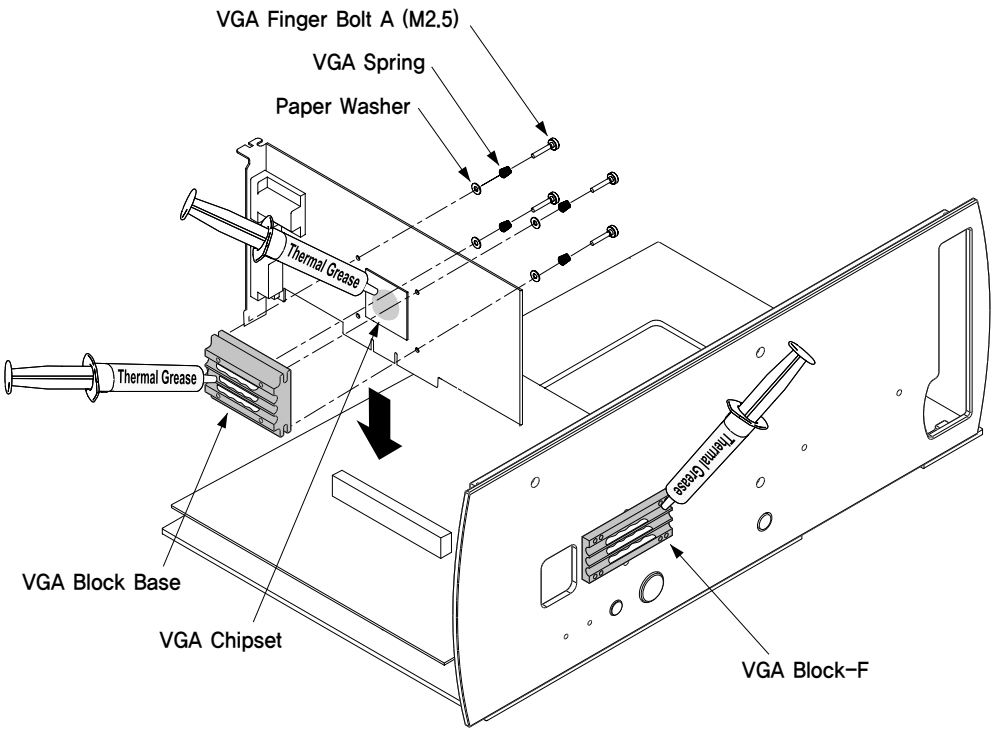
③ Apply a thin layer of thermal grease on the VGA chipset.

※ Note

- ▶ Most VGA chipsets on the VGA card have a concave curvature towards the middle and need more thermal grease at the center.
- ▶ VGA block-F already has thermal grease applied underneath, so do not separate it under normal circumstances.

④ Make sure the VGA block base is level and firmly installed onto the VGA chipset using the paper washers, the VGA springs, and the VGA finger bolts A(M2.5).

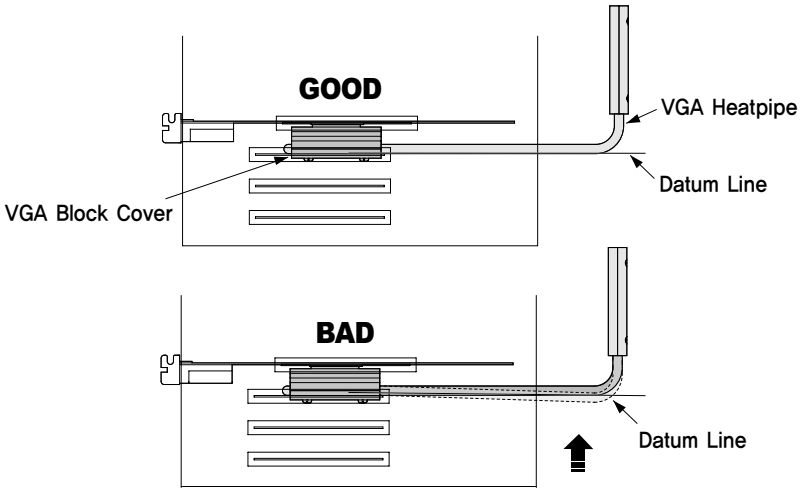
⑤ Apply thermal grease evenly onto the VGA block base and the grooves on the VGA block-F, and install the VGA card on the motherboard.



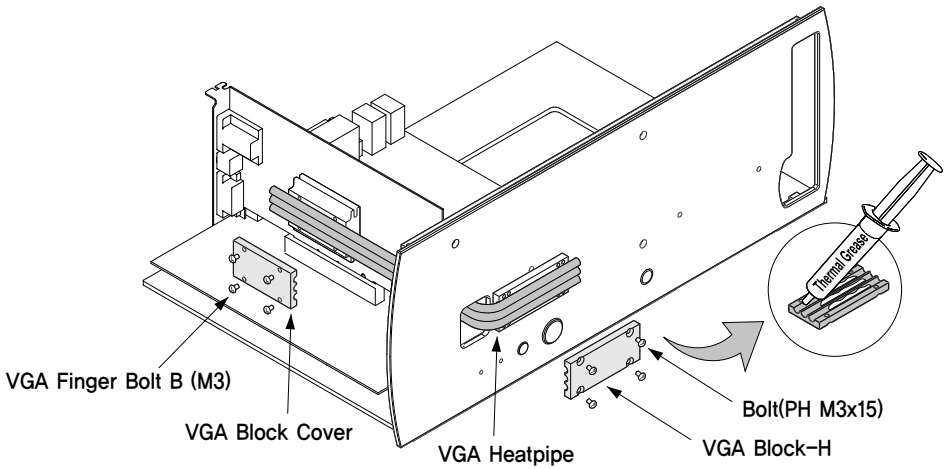
※ Note

▶ VGA cards have VGA chipsets in varying locations. The user may need to modify the VGA heatpipes to accommodate the location.

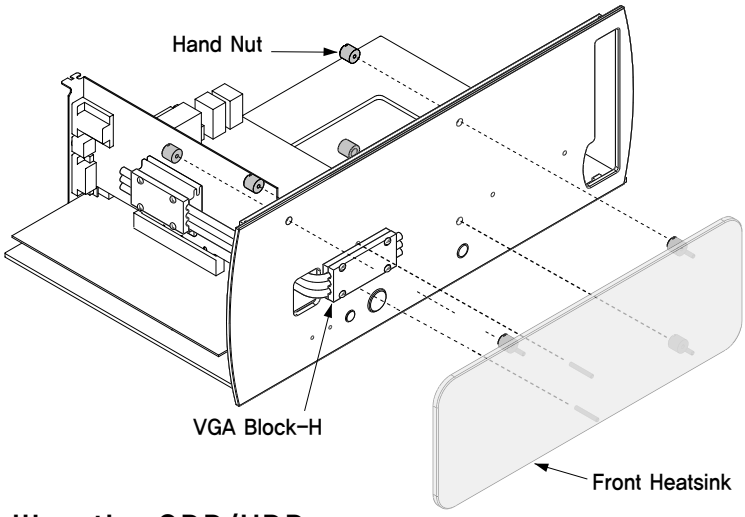
▶ If the VGA Heatpipes must bend below the datum line, the VGA Heatpipes will not function optimally and the VGA chipset may get damaged. Check the alignment before proceeding.



⑥ Install the VGA heatpipes in sequence and fix the VGA block cover over them. Then, fix the VGA block-H in its place.



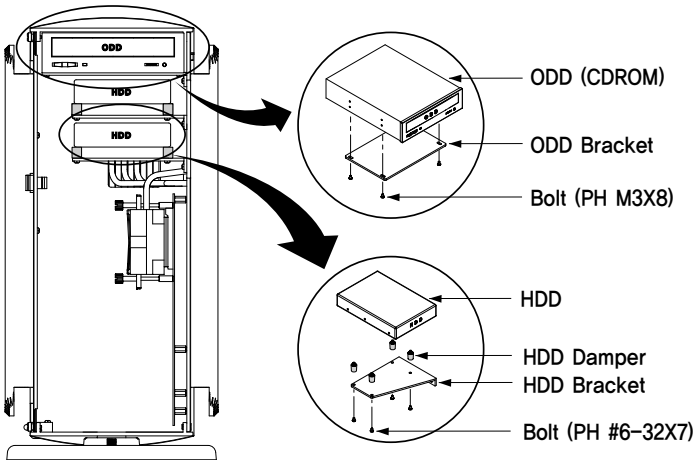
⑦ Stick the thermal pad on the VGA block-H and install the front heatsink over it.



7) Installing the ODD/HDD

① Take off the ODD/HDD installation bracket and install the ODD/HDD onto the bracket.

② Install the bracket with the ODD/HDD on the side of the case.



8) Connecting the Power & Data Cables

① Check whether the power connector on the motherboard is a 24 pin or 20 pin type connector and connect the appropriate Motherboard Power Cable.

② Connect the various power and data cables as needed.

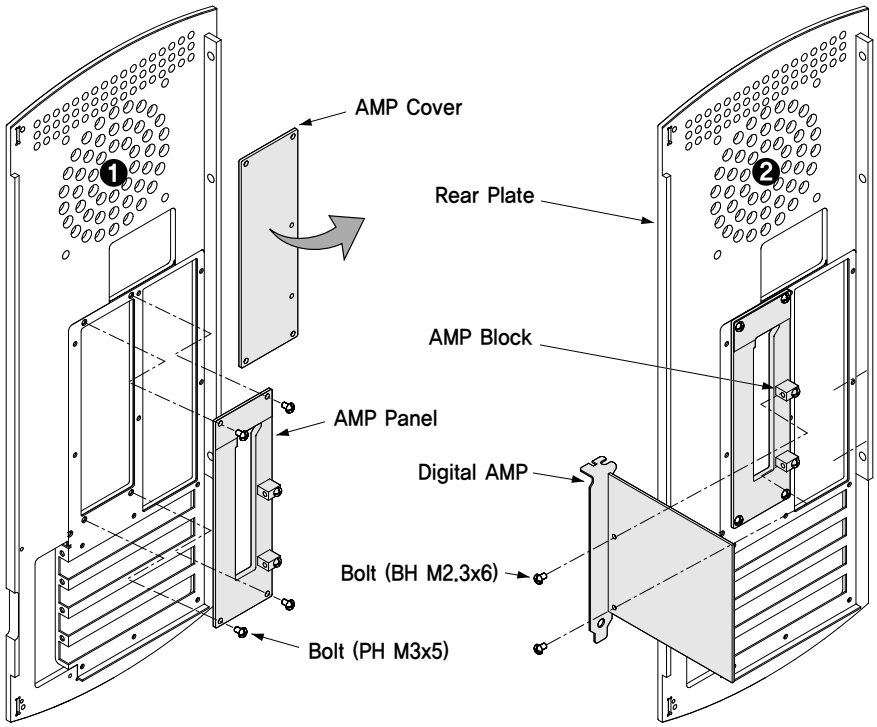
9) Installing the Digital Amp (Optional)

※ Note

- ▶ Connect only passive speakers (without integrated amp) with 4~8Ω impedance.
- ▶ Connecting the PSU's 12V 4-pin connector and an external DC power source at the same time can damage the amp. Therefore, this product does not come with an external power adapter. (If you need one, we recommend a 19V 3A SMPS type adaptor.)
- ▶ If the sound card's output level is low (50mV or less), the Amp goes into sleep mode. In this case, set the Amp's sleep mode jumper to OFF.
- ▶ Set volume to about 80%, then use the volume control within the OS for adjustments.

① Remove the Amp Cover and install the Amp Panel on the Rear Plate.

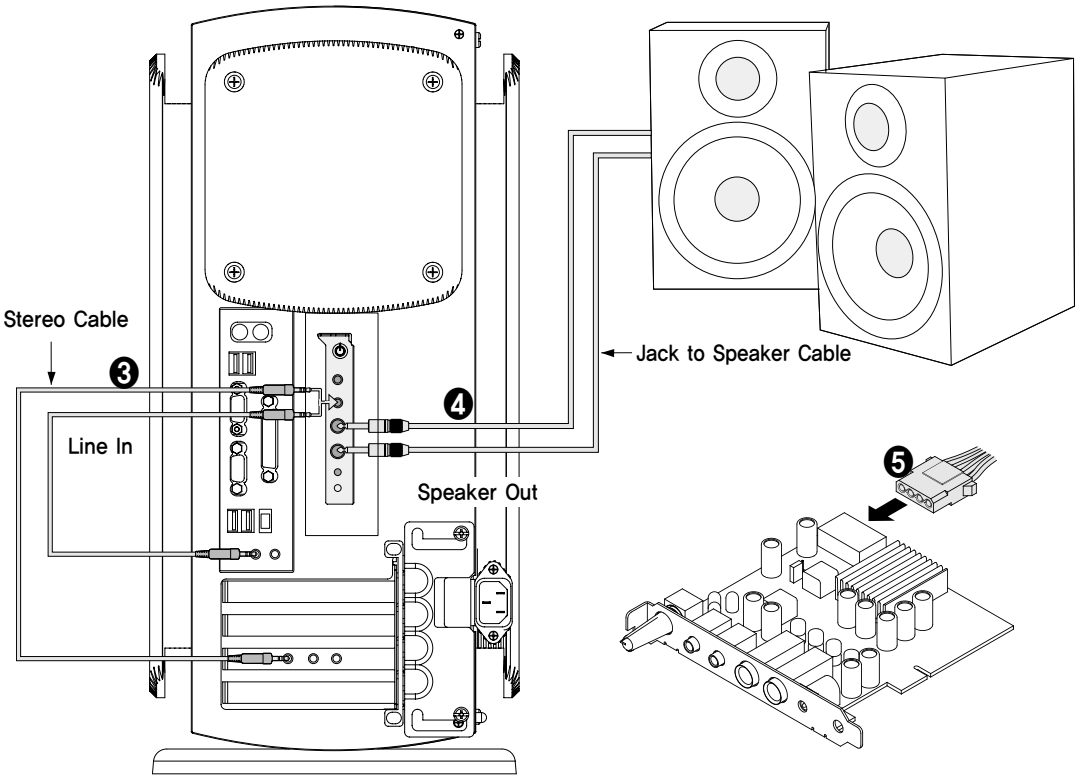
② Insert the Digital Amp from the inside of the case to the Amp Panel as shown in the diagram and use the bolts to fasten it on the Amp Block.



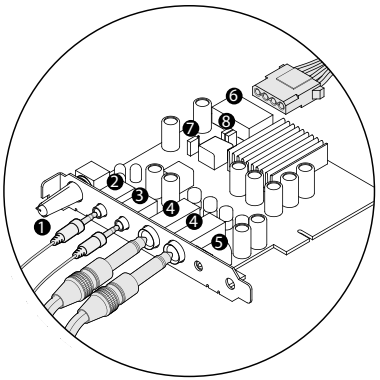
③ Connect the Line Out of the sound card to the Line In of the Digital Amp using the stereo cable.

④ Connect the Speaker Outs to the speakers using the Jack to speaker cables.

⑤ Connect the computer power supply's 4-pin power cable to the Digital Amp's internal power connector.



Reference)



① Volume Control
② Headphone Output
③ Line In
④ Speaker Out (Left, Right)
⑤ External Power Connector (Not Used)
⑥ Internal Power Connector
⑦ Sleep Mode Jumper (Auto Power Saving)
⑧ Gain Mode Jumper(0dB, 3dB / 0dB default)

10 Trademarks and Copyright Notice

All trademarks are the properties of their respective owner's.

- ZALMAN and TNN are registered trademarks of ZALMAN Tech Co., Ltd.
- Intel, Pentium, and Prescott are registered trademarks of Intel Corporation.
- Microsoft, and Microsoft Windows 95/98/Me/2000/NT/XP are registered trademarks of Microsoft Corporation.
- AMD, AMD64, and AMD Athlon 64 are registered trademarks of AMD Corporation.
- PS/2, and VGA are registered trademarks of International Business Machines Corporation (IBM).
- NVDIA, GeForce, GeForce2, GeForce3-MX, GeForce-Ti, GeForceFX, GeForce PCX are registered trademarks of NVIDIA Corporation.
- PCI Express is a registered trademark of PCI-SIG Corporation.
- ATI, and ATI Radeon are registered trademarks of ATI Technologies Inc.
- Powernics is a registered trademark of Powernics Corporation.
- GMC is a registered trademark of G. M. Corporation.
- ASRock is a registered trademark of ASRock Inc.
- Samsung is a registered trademark of Samsung Corporation.
- Seagate is a registered trademark of Seagate Technology LLC.

Ⓡ 2005 by Zalman Tech Co., Ltd.
Copying or publishing this user's guide without consent of Zalman Tech Co., Ltd. is prohibited.

Disposal of Old Electrical & Electronic Equipment
(Applicable in the European Union and other European countries with separate collection systems)